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Immunomodulatory herbs of Ayurveda and Covid-19 : A Review Article

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ABSTRACT

COVID-19 (coronavirus disease 2019) is an infectious disease caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), previously known as 2019 novel corona virus. The first cases were seen in Wuhan, China. The current outbreak was officially recognized as a pandemic on 11 March 2020. The most common symptoms are fever, tiredness, and dry cough. Some individuals also develop aches and pains, nasal congestion, runny nose, sore throat, or diarrhea. It was reported that traditional remedies may alleviate the symptoms of COVID-19. Ayurveda is the world's oldest medical system that can manage any disease without side effects. Ayurveda being the science of life, propagates the gifts of nature in maintaining healthy and happy living. We all know that "prevention is better than cure". While there is no medicine for COVID-19 as of now, it will be good to take preventive measures which boost our immunity in these times. Ayurveda's extensive knowledge base on preventive care by which each individual can achieve by uplifting and maintain his or her immunity. In Ayurveda, Immunity comes under the heading of *Vyadhiksamatwa*. In Ayurveda, many single drugs or compound formulation were mentioned as *Rasayana* to boost up Immunity (*Bala* or *Vyadhiksamatwa*).

Key words: Covid-19, Ayurveda, Prevention, Immunity, *Vyadhiksamatwa*, *Rasayana*.

INTRODUCTION

Corona virus disease 2019 (COVID-19) is defined as illness caused by a novel corona virus now called severe acute respiratory syndrome corona virus 2 (SARS-CoV-2; formerly called 2019-nCoV), which was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China. It was initially reported to the WHO on December 31, 2019. On January 30, 2020, the WHO declared the COVID-19

a global pandemic, its first such designation since declaring H1N1 influenza a pandemic in 2009.^[1] COVID-19 typically presents with systemic and/or respiratory manifestations. Some individuals infected with SARS-CoV-2 are asymptomatic and can act as carriers symptoms and signs are non-specific such as fever (85-90%), cough (65-70%), fatigue (35-40%), sputum production (30-35%) and shortness of breath (15-20%).^[2] On 24th April 2020, the number of cases of confirmed COVID-19 globally is over 2.7 million.^[3]

Although COVID-19 originating from animals but it affects human and it is primarily transmitted in a similar way to the common cold, via contact with droplets of infected individual's upper respiratory tract secretions, e.g. from sneezing or coughing.^[4] There is no established medicine or vaccine for COVID-19 as of now. So, prevention is the key to combat from COVID-19. Government of India, Ministry of AYUSH recommends some preventive health measures and boosting immunity with special reference to respiratory health. Immunity is a

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biological term that describes a state of having sufficient biological defences to avoid infection, disease or other unwanted biological invasion.

The immune system helps to protect the host from pathogens while minimizing damage to self tissue.^[5] Immune system is the second line of body defense mechanism.^[6]

The immune system consists of an intricately linked network of cells, proteins and lymphoid organs which are strategically placed to ensure maximal protection against infection. Immune defences are normally categorized into the innate immune response, which provides immediate protection against an invading pathogen, and the adaptive or acquired immune response, which takes more time to develop but confers exquisite specificity and long lasting protection.^[7]

Concept of immunity in ancient science of life i.e., Ayurveda offers a holistic approach and a potential promise regarding immunotherapy. The main purpose and objectives of Ayurveda is the preservation of health in healthy individual and eradication of diseases which are curable. Ayurveda emphasizes the promotion of health through the strengthening of host defences, to act as a resistive force against day to day physiological extremes as well as opportunistic maladies. This force to reckon with, as regards everyday wellness is termed as “*Vyadhiksamatwa*” in Ayurveda. The concept expounds both preventive medicine aspects along with curative aspects of treatment as the self-explanatory terms - “*Vyadhibalavirodhitvam*” and “*Vyadyutpadapratibandhakatvam*”.^[8]

Vyadhiksamatwa is of tremendous importance in the daily wellness of human beings; for prevention and recovery from diseases. When etiological factors come in contact with the body they try to produce disease. At the same time the body tries to resist the disease. *Vyadhiksamatwa* in Ayurveda is not merely immunity against a specific infectious agent or disease. Rather, *Vyadhiksamatwa* implies a resistance against the loss of the integrity, proportion and interrelationship amongst the individual’s *Dosas* and

Dhatus. Ayurveda classics described countless useful dravya, formulations, mode of conducts to enhance immunity (*Bala* or *Vyadhiksamatwa*).

AIMS AND OBJECTIVES

1. To analyze about prevention of COVID-19 through Ayurveda.
2. To show the importance of Ayurveda to enhance immunity.

MATERIALS AND METHODS

Material - Relevant literature is referred in *Samhitas*, *Sangraha Granthas* and contemporary literature.

Methodology - Review study

Literature related to the title is explored from all reliable Ayurvedic journals and Modern journals from internet. Conclusion has been drawn from comparison and rationale.

DISCUSSION

COVID-19 is a pandemic disease which infects peoples globally. Ayurveda which was evolved thousands of years ago described epidemics in the name of “*Janapadodhvansa*”^[9] or “*Marak*”.^[10] In the treatment of said *Rasayana* therapy along with *Swasthavritta Paripalana* (*Dinacharya* and *Ritucharya*) were clearly mentioned. *Satmya Ahara*, *Nidra* (regular proper sleep), *Yogic Asanas* and *Bramhacharya* to be followed to boost up *Vyadhiksamatwa*. Here *Rasayana* therapy is discussed in brief. *Rasayana* therapy promotes and rejuvenate the physiology of body, produce resistance against disease both physically and mentally.

Rasayana is made up of two words: *Rasa* and *Ayana*. *Rasa* primarily means essential seven vital tissues (*Saptadhatu* e.g. *Rasa*, *Rakta*, *Mamsa*, *Medha*, *Asthi*, *Majja* and *Sukra*). *Ayana* means the path or channel. So, *Rasayanas* are those that bring about proper uptake, growth and improvement of essential *Saptadhatu*.

According to Acharya Charaka, a person undergoing *Rasayana* or rejuvenation therapy attains longevity, memory, intellect, freedom from diseases.^[11]

Rasayana Chikitsa boosts the *Ojas* (immune system). *Rasayana* is the one that is concerned with the immunity enhancer. *Rasayana* is a treatment in which the body constituents are prepared to adapt to a selective tissue endowment program. This concept in modern scientific understanding would mean the enhancement of immune responsiveness of an organism against pathogens by non-specifically activating the immune system with immunomodulatory agents of plant origin. *Rasayana* improve the host resistance of an individual, helping to prevent aging and diseases. *Rasayana Chikitsa* or rejuvenation therapy helps to promote and preserve health and longevity in the healthy, and to cure disease in sick. *Rasayana* is helpful to increase the immunity of the person to keep him away from opportunistic diseases. The possible mechanisms by which action of *Rasayana* can be interpreted with modern aspects are as follows: nutritive function, immunomodulatory action, antioxidant action, anti-aging action, neuro-protective action, haemopoietic effect etc. There are numbers of medicinal plants which play an important role to enhance immune system like;

Tinospora cordifolia - Commonly known as *Guduchi* or *Amrita* contain chemical constituents tinosporin, tinosporide and cordifolide. It has antioxidant, phagocytic activities, antipyretic action as well as immunomodulatory properties.^[12] It is also mentioned as *Medhya Rasayana* in Charaka Samhita.^[13]

Emblica officinalis - Commonly known as *Amalaki* or Indian gooseberry rich source of Vitamin-C. It contain low molecular weight hydrolysable tannins. It also contain ellagic acid, linolic acid etc. as chemical constituents showing activities against carcinogenesis, it also shows cytoprotective, anti-inflammatory, anti microbial, antioxidant and immunomodulator activities.^[14]

Withania somnifera - Commonly known as *Aswagandha* or Indian ginseng contain withaferin A, withanone, withasomnine as major chemical constituents. It has established anti-inflammatory,

antidepressant, antioxidant and immunomodulatory activities.^[15]

Piper longum - Commonly known as *Pippali* or Long pepper which contain piperine, pipartine, pellitorine, caryophyllene etc. as major chemical constituents. In Atharvaveda, *Pippali* is mentioned as *Rasayana*. Acharya Charaka and Susruta also mention *Pippali* as *Rasayana*. It has anti-inflammatory, antispasmodic and immunomodulatory properties.^[16]

Terminalia chebula - Commonly known as *Haritaki* or *Harad* contain chebulinic acid, anthraquinone, arachidic acid etc. as major chemical constituents. In Ayurvedic classics, *Haritaki* mentioned as *Rasayana*, *Tridoshahara* indicated for *Swasa* and *Kasa*. It has established antibacterial, antispasmodic, antioxidant and immunomodulatory activities.^[17]

Allium sativum - Commonly known as *Lahasun* or Garlic contain alliin, vitamins (folic acid, niacin, riboflavin, thiamine, vit.c), allicin, allisatin etc. as major chemical constituents. It has anti-inflammatory, antimicrobial activity. It is mentioned as *Rasayana* in Ayurvedic classics and it's indicated for *Shwasa*, *Kasa* etc.^[18]

Curcuma longa - Commonly known as *Haridra* or *Haladi* contain curcumene, curcumenone, curcone, eugenol, curcumins etc. as major chemical constituents. It has established antibacterial, anti-inflammatory and antioxidant properties.^[19]

Zingiber officinale - Commonly known as *Sunthi* or Ginger which contain α - and β - zingiberenes, zingiberol, zingerone, gingerol, α - curcumene etc. as major chemical constituents. It has anti-inflammatory, anticholinergic, antihistaminic, antioxidant activities and it also has bioavailability enhancer property.^[20]

Azadirachta indica - Commonly known as *Neem* or Margosa tree contain azadirachtin, nimbin, nimbidin, azadirachtol and arachidic acid etc. as major chemical constituents. It shows anti-inflammatory, anti-microbial and immunostimulant activity.^[21]

Moringa pterygosperma - Commonly known as *Sigru* or *Sahijana* contain sterols, moringine, moringinine, pteregospermine etc. as major chemical constituents.

It has established antimicrobial, antioxidant, anti-inflammatory and antiviral activities.^[22]

Glycyrrhiza glabra - Commonly known as *Yashtimadhu* or Liquorice which contain glycyrrhizin, glycyrrhizic acid, glycyrrhetic acid and glabrine etc. as major chemical constituents. It has anti-inflammatory, antipyretic and antioxidant properties. It also mentioned as *Rasayana* in Ayurvedic texts.^[23]

Mangifera indica - Commonly known as *Amra* or Mango contain mangiferin, quercetin, gallic acid as chemical constituents which show antiviral as well as anti-influenza activities.^[24]

Ocimum sanctum - Commonly known as *Tulasi* or Holy basil contain bornyl acetate, cadinene, camphene, eugenol and limonene as major chemical constituents. It shows antibacterial, antifungal, adaptogenic, antiviral and immunomodulatory activities.^[25]

Centella asiatica - Commonly known as *Mandukaparni* or *Gotukola* contain asiatic acid, centic acid, centellic acid, carotene etc. as major chemical constituents. It has established *Rasayana* (anabolic), analgesic and immunomodulatory properties. It has been mentioned as *Medhya Rasayana* in Ayurvedic classics.^[26]

Terminalia bellerica - Commonly known as *Vibhitaki* or *Bahed* contain chebulagic acid, ellagic acid, gallic acid, mannitol as major chemical constituents. It has antispasmodic, antihistaminic, antibacterial, antiviral and antioxidant property.^[27]

Albizia lebbek - Commonly known as *Sirisa* or *Siris* contain albigenin, albiziagenin, lebbecacidin, myricitrin as major chemical constituents. It shows anti-inflammatory, antihistamine, antioxidant and anticancer activities.^[28]

Probable mode of action

Rasayanas are those that bring about proper uptake, growth and improvement of essential seven vital tissues, which ultimately increases *Oja*. Thus there is regeneration of cells and body tissues leading to increased immunity.

When *Rasayana* drugs of different *Rasas* are taken, they are digested by *Jatharagni* followed by *Bhutagni*. During this phase *Vata*, *Pitta* and *Kapha* produced along with *Sara* part i.e. *Ahaara Rasa*. This qualitative *Ahaara Rasa* produces pure *Rasa Dhatu*, which then continues the chain of production of other *Raktadi Dhatus* with the help of respective *Dhatavagni* upto *Ojas* formation. Therefore well formed *Dhatus* keep on nourishing the body till they are taken. *Rasayana* drugs act at the level of *Rasa* by improving the nutritional value of the *Poshak Rasa* which helps to obtain the best quality of *Dhatu* and some *Rasayana* drugs act at the level of *Agni* and *Strotas* by improving digestion and metabolism. The *Rasayana* drugs possessing the *Ushna*, *Laghu*, *Ruksha*, and *Katu*, *Tikta*, *Kashaya Rasa* acts at level of *Agni*, vitalizing the organic metabolism leading to an improved structural and functional pattern of *Dhatus*.^[29] Drugs such as *Pippali*, *Rasona*, *Haritaki* mainly acts at level of *Agni* to improve the digestion and create excellence of *Saptadhatu*. Similarly *Amalaki*, *Amrita*, *Pippali* etc. are supposed to act the level of *Dhatwagni* also causing excellence of all *Dhatus*.

Vyadhikshamatava is depends on the presence of *Bala* in the body. *Rasayana* drugs also influence *Oja* which increases *Sharira Bala*. A person with appropriate amount of *Bala* is also said *Saptadhatu*sara. This provides the capacity to resist the external disease causing agents.

Thus *Rasayana* can act as immunomodulator, by strengthening the immunity.

Probable mechanism through which immunity prevents infections

When a virus infects a person (host), it invades the cells of its host in order to survive and replicate. Once inside, the cells of the immune system cannot 'see' the virus and therefore do not know that the host cell is infected. To overcome this, cells employ a system that allows them to show other cells what is inside them - they use molecules called **class I major histocompatibility complex proteins** (or **MHC class I**, for short) to display pieces of protein from inside the cell upon the cell surface. If the cell is infected with a

virus, these pieces of peptide will include fragments of proteins made by the virus.

A special cell of the immune system called a **T cell** circulates looking for infections. One type of T cell is called a **cytotoxic T cell** because it kills cells that are infected with viruses with toxic mediators. Cytotoxic T cells have specialised proteins on their surface that help them to recognise virally-infected cells. These proteins are called **T cell receptors (TCRs)**. Each cytotoxic T cell has a TCR that can specifically recognise a particular antigenic peptide bound to an MHC molecule. If the T cell receptor detects a peptide from a virus, it warns its T cell of an infection. The T cell releases **cytotoxic factors** to kill the infected cell and, therefore, prevent survival of the invading virus.^[30]

CONCLUSION

In brief, through Ayurvedic concept of *Vyadhikshamatwa* not only we can keep at bay the physical bodily ailments but also definitely prevent various psychosocial discrepancies. Hence, for attaining good *Vyadhikshamatwa*, we should use various regimens and follow conducts as described in Ayurvedic texts for the same. Thus from the above we can conclude that *Rasayana* has important role in immunity enhancement and prevent infections whether bacterial or viral. So, it is required to create awareness among people about *Rasayana* drugs, which will prevent disease and promote health of the every individual.

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